PLANET
Networking & Communication

5/8-port
10/100Mbps Fast Ethernet Switch

SW-501 / SW-801

User's Manual

user's guide, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

CE Mark Warning

In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

Revision

User's manual for PLANET 5/8-port Switch

Model: **SW-501, SW-801**

Rev: 1.0 (October. 2002)

Part No. 2010-000014-000

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About This Manual

Congratulations on your purchasing of SW-501/SW-801, 5/8-port 10/100Mbps Fast Ethernet Switch. This device integrates 100Mbps Fast Ethernet and 10Mbps Ethernet network capabilities in a highly flexible desktop package.

Purpose

This manual discusses how to install your SW-501/SW-801, 5/8-port 10/100Mbps Fast Ethernet Switch.

Terms/Usage

In this manual, the term "**Switch**" (first letter upper case) refers to your 5/8-port 10/100Mbps Ethernet Switch, and "**switch**" (first letter lower case) refers to other Ethernet switches.

This guide provides the information you need to install and configure the following models of the Switch:

●   5-port 10/100Mbps Ethernet Switch. SW-501

●   8-port 10/100Mbps Ethernet Switch. SW-801

Overview of this User's Manual

Chapter 1   Introduction

This chapter describes the features of the Switch and some background information about Ethernet/Fast Ethernet switching technology.

Fast Ethernet Technology

The growing importance of LANs and the increasing complexity of desktop computing applications are fueling the need for high performance networks. A number of high-speed LAN technologies have been proposed to provide greater bandwidth and improve client/server response times. Among them, 100BASE-T (Fast Ethernet) provides a non-disruptive, smooth evolution from the current 10BASE-T technology. The non-disruptive and smooth evolution nature, and the dominating potential market base, virtually guarantee cost effective and high performance Fast Ethernet solutions in the years to come.

100Mbps Fast Ethernet is an extension of the 10Mbps Ethernet standard with the ability to transmit and receive data at 100Mbps, while maintaining the CSMA/CD Ethernet protocol. Since the 100Mbps Fast Ethernet is compatible with all other 10Mbps Ethernet environments, it provides a straightforward upgrade and takes advantage of the existing investment in hardware, software, and personnel training.

Switching Technology

Another approach to pushing beyond the limits of Ethernet technology is the development of switching technology. A switch bridge Ethernet packets at the MAC address level of the Ethernet protocol transmitting among connected Ethernet or Fast Ethernet LAN segments.

Switching is a cost-effective way of increasing the total network capacity available to users on a local area network. A switch increases capacity and decreases network loading by dividing a local area network into different *segments*, which don't compete with each other for network transmission capacity.

The switch acts as a high-speed selective bridge between the individual

segments. The switch, without interfering with any other segments, automatically forwards traffic that needs to go from one segment to another. By doing this the total network capacity is multiplied, while still maintaining the same network cabling and adapter cards.

For Fast Ethernet networks, a switch is an effective way of eliminating problems of chaining hubs beyond the "two-repeater limit." A switch can be used to split parts of the network into different collision domains, making it possible to expand your Fast Ethernet network beyond the 205-meter network diameter limit for 100BASE-TX networks. Switches supporting both traditional 10Mbps Ethernet and 100Mbps Fast Ethernet are also ideal for bridging between the existing 10Mbps networks and the new 100Mbps networks.

Switching LAN technology is a marked improvement over the previous generation of network bridges, which were characterized by higher latencies. Routers have also been used to segment local area networks, but the cost of a router, the setup and maintenance required make routers relatively impractical. Today switches are an ideal solution to most kinds of local area network congestion problems.

Features

The Switches were designed for easy installation and high performance in an environment where traffic on the network and the number of user increase continuously.

The Switches with their small, compact size were specifically designed for small to middle workgroups. These Switches can be installed where space is limited; moreover, they provide immediate access to a rapidly growing network through a wide range of user-reliable functions.

The Switches are ideal for deployment with multiple high-speed servers for shared bandwidth 10Mbps or 100Mbps workgroups. With the highest bandwidth 200Mbps (100Mbps full-duplex mode), any port can provide workstations with a congestion-free data pipe for simultaneous access to the server.

The Switches are expandable by cascading two or more switches together.

As all ports support 200Mbps, the Switches can be cascaded from any port and to any number of switches.

The Switches are a perfect choice for site planning to upgrade to Fast Ethernet in the future. Ethernet workgroups can connect to the Switches now, and change adapters and hubs anytime later without needing to change the Switches or reconfigure the network.

The Switches combine dynamic memory allocation with store- and-forward switching to ensure that the buffer is effectively allocated for each port, while controlling the data flow between the transmit and receive nodes to guarantee against all possible packet loss.

The Switches are unmanaged 10/100 Fast Ethernet Switch that offers solutions in accelerating small Ethernet workgroup bandwidth.

Other key features:

- Auto MDI/MDIX for each port for Uplink to another switch, hub or repeater.
- Store and forward switching scheme capability. As the result of complete frame checking and error frame filtering, this scheme prevents error packages from transmitting among segments.
- N-Way Auto-negotiation for any port. This allows for auto-sensing of speed (10/100Mbps) thereby providing you with automatic and flexible solutions in your network connections.
- Flow control for any port. This minimizes dropped packets by sending out collision signals while the port's receiving buffer is full. Note that flow control is only available in half-duplex mode.
- Data forwarding rate per port is at wire-speed for 100Mbps speed.
- Data forwarding rate per port is at wire-speed for 10Mbps speed.
- Data filtering eliminates all error packets, runts, etc., per port at wire-speed for 100Mbps speed.
- Data filtering eliminates all error packets, runts, etc., per port at wire-speed for 10Mbps speed.
- Up to 1K active MAC address entry table with self-learning and table-aging for the Switch.

Chapter 2　Unpacking and Setup

This chapter provides unpacking and setup information for the Switches.

Unpacking

Open the shipping cartons of the Switch and carefully unpacks its contents. The carton should contain the following items:

- One 5/8-port 10/100Mbps Ethernet Switch

- One external power adapter

- This User's manual

If any item is found missing or damaged, please contact your local reseller for replacement.

Setup

The setup of the Switch can be performed using the following steps:

- The surface must support at least 1.5 Kg for the Switch.

- The power outlet should be within 1.82 meters (6 feet) of the Switch.

- Visually inspect the DC power jack and make sure that it is fully secured to the power adapter.

- Make sure that there is proper heat dissipation from and adequate ventilation around the Switch. Do not place heavy objects on the Switch.

Note: To prevent from device damage, please use the bundled AC Adapter before power on your Switch.

Chapter 3   Identifying External Components

This section identifies all the major external components of the hub. Both the front and rear panels are shown followed by a description of each panel feature. The indicator panel is described in detail in the next chapter.

Front Panel

The figure below shows the front panels of the switches.
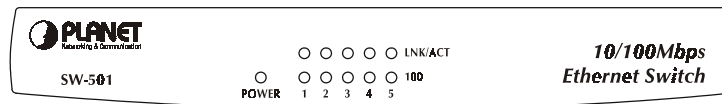
Front Panel of SW-501
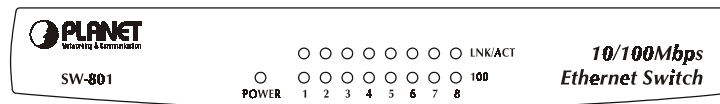
Front Panel of SW-801

LED Indicator Panel, refer to the LED Indicator section for detailed information about each of the Switch's LED indicators.

Rear Panel

Rear Panel of SW-501

Rear Panel of SW-801

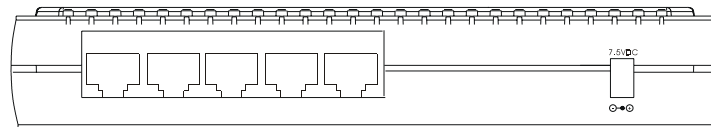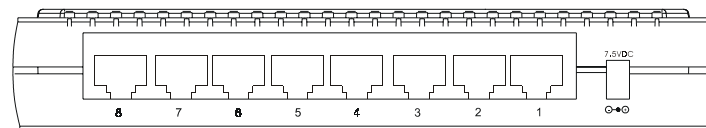| DC Power Jack:	Power is supplied through an external AC power adapter. Check the printing on the adapter for information about the AC power input voltage. Since the switch does not include a power switch, plugging its power adapter into a power outlet will immediately power it on.
Numbered MDI/MDI-X Jacks:	Use these jacks to connect stations to the switch. These are numbered MDI/MDI-X jacks, which mean, you can use ordinary straight or crossover twisted-pair cables to connect user machines and servers to the switch through them.

Note:

1. The Switch is a power-required device, it means, the Switch will not work until it is powered. If your networked PCs will need to transmit data all the time, please consider use an UPS (Uninterrupted Power Supply) for your Switch. It will prevent you from network data loss.

2. In some area, installing a surge suppression device may also help to protect your Switch from being damaged by unregulated surge or current to the Switch or the power adapter.

LED Indication

LED	Indication	Description
POWER	**Power Indication**	This indicator lights green when the Switch is receiving power, otherwise, it is off.
LNK/ACT	**Link/ Activity**	This indicator light green when the port is connected to an Ethernet or Fast Ethernet device, If the indicator is blinking green, the port is transmitting or receiving data on the network.
100	**100Mbps**	This LED indicator light green when a Fast Ethernet device is connected. It remains OFF if an Ethernet device is connected.

Chapter 4 Connecting The Switch

This chapter describes how to connect the Switch to your Fast Ethernet network.

PC to Switch

A PC can be connected to the Switch via a two-pair Category 3, 4, 5 UTP/STP straight cable. The PC (equipped with a RJ-45 10/100Mbps phone jack) should be connected to any of the 5/8 numbered port.

The LED indicators for PC connection depend on the LAN card capabilities. If LED indicators are not light after making a proper connection, check the PC LAN card, the cable, the Switch conditions and connections. The following are LED indicator possibilities for a PC to Switch connection: The LNK/ACT and 100 LED indicators light green for hookup to 100Mbs speed. The LNK/ACT lights green, while 100 LED off for hookup to 10Mbps speed.

Hub to Switch

A hub (10 or 100BASE-TX) can be connected to the Switch via a two-pair Category 3, 4, 5 UTP/STP straight or crossover cable. The connection is accomplished from the hub Uplink (MDI-X) or normal (MDI) port to any of the Switch (MDI/MDI-X) ports:
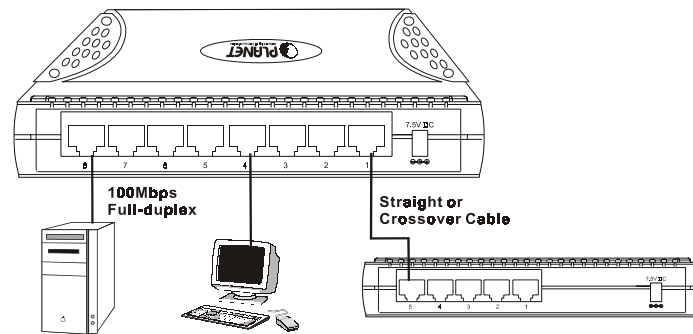
A. 10BASE-T Hub

For a 10BASE-T hub, the Switch LED indicators should light up as the following:

- 100 LED indicator is *OFF.*
- LNK/ACT LED indicator lights green.

B. 100BASE-TX Hub

For a 100BASE-TX hub, the Switch LED indicators should light up as the following:

- LNK/ACT,100 LED indicators light green.

Switch to switches (other devices)

The Switch can be connected to another switch or other devices (routers, bridges, etc.) via a two-pair Category 3, 4, 5 UTP/STP straight or crossover cable. When using straight or crossover cable, this is done from the any (MDI/MDIX) port of the Switch to any of the 10Mbps or 100Mbps, MDI or MDI-X port of the other switches/devices. The LNK/ACT, 100 LED indicators light green for hookup to 100Mbps speed or only LNK/ACT light green for hookup to 10Mbps speed.

Port Speed & Duplex Mode

After plugging the selected cable to a specific port, the system uses auto-negotiation to determine the transmission mode for any new twisted-pair connection. **If the attached device does not support auto-negotiation or has auto-negotiation disabled**, an auto-sensing process is initiated to select the speed and set the duplex mode to **half-duplex**.

Chapter 5   TECHNICAL SPECIFICATIONS

Standards	IEEE 802.3 10Base-T Ethernet IEEE 802.3u 100 Base-TX Fast Ethernet
Protocol	CSMA/CD
Data Transfer Rate	Ethernet: 10Mbps (half duplex), 20Mbps (full duplex) Fast Ethernet: 100Mbps (half duplex), 200Mbps (full duplex)
Topology	Star
Network Cables	10BASET: 2-pair UTP Cat. 3,4,5 (100 m), EIA/TIA- 568 100-ohm STP (100 m) 100BASE-TX: 2-pair UTP Cat. 5 (100 m), EIA/TIA-568 100-ohm STP (100 m)
Number of Ports	5/8 x 10/100Mbps ports
DC inputs	DC 7.5V / 1A
Power Consumption	7.5 watt. (max.)
Temperature	Operating: 0 ~ 50 degree C, Storage: -10 ~ 70degree C
Humidity	Operating: 10% ~ 90%, Storage: 5% ~ 90%
Dimensions (WxDxH, mm)	Plastic: 170 x 87 x 32
EMI	FCC, CE
Performance	
Transmit Method	Store-and-forward
RAM Buffer	128K bytes on-chip packet buffer
Filtering Address Table	Up to 1K entries per device
Packet Filtering/ Forwarding Rate	10Mbps Ethernet: 14,880pps 100Mbps Fast Ethernet: 148,800pps
MAC Address Learning	Automatic update

Appendix A   RJ-45 PIN Specification

When connecting your 10/100Mbps Ethernet Switch to another switch, a bridge or a hub, a straight or crossover cable is necessary. Each port of the Switch supports auto-MDI/MDI-X detection. That means you can directly connect the Switch to any Ethernet devices without making a crossover cable. The following table and diagram show the standard RJ-45 receptacle/ connector and their pin assignments:

RJ-45 Connector pin assignment		
Contact	MDI Media Dependant Interface	MDI-X Media Dependant Interface -Cross
1	Tx + (transmit)	Rx + (receive)
2	Tx - (transmit)	Rx - (receive)
3	Rx + (receive)	Tx + (transmit)
4, 5	Not used	
6	Rx - (receive)	Tx - (transmit)
7, 8	Not used	

The standard cable, RJ-45 pin assignment
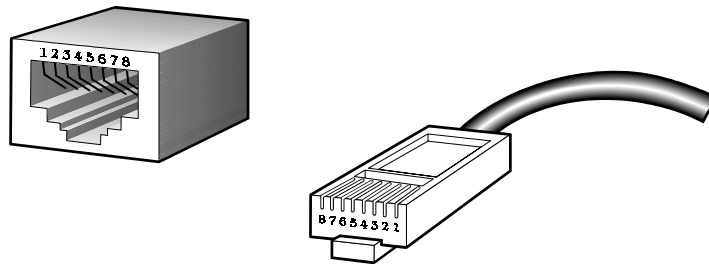
The standard RJ-45 receptacle/connector

There are 8 wires on a standard UTP/STP cable and each wire is color-coded. The following shows the pin allocation and color of straight cable and crossover cable connection:

Figure A-1: Straight-Through and Crossover Cable

Please make sure your connected cables are with same pin assignment and color as above picture before deploying the cables into your network.

Appendix B   SWITCH OPERATION

Address Table

The Switch is implemented with an address table. This address table composed of many entries. Each entry is used to store the address information of some node in network, including MAC address, port no, etc. The information comes from the learning process of Ethernet Switch.

Learning

When one packet comes in from any port, the Ethernet Switch will record the source address, port no. and the other related information in address table. These information will be used to decide either forwarding or filtering for future packets.

Forwarding & Filtering

When one packet comes from some port of the Ethernet Switch, it will also check the destination address besides the source address learning. The Ethernet Switch will lookup the address table for the destination address. If not found, this packet will be forwarded to all the other ports except the port which this packet comes in. And these ports will transmit this packet to the network it connected. If found, and the destination address is located at different port from this packet comes in, the Ethernet Switch will forward this packet to the port where this destination address is located according to the information from address table. But, if the destination address is located at the same port with this packet comes in, when this packet will be filtered. Thereby increasing the network throughput and availability

Store-and-Forward

Store-and-Forward is one type of packet-forwarding techniques. A Store-and-Forward Ethernet Switch stores the incoming frame in an internal buffer, do the complete error checking before transmission. Therefore, no error packets occurrence, it is the best choice when a network needs efficiency and stability. The Switch scans the destination address from the

packet header, searches the routing table provided for the incoming port and forwards the packet, only if required. The fast forwarding makes the switch attractive for connecting servers directly to the network, thereby increasing throughput and availability. However, the switch is most commonly used to segment existing hubs, which nearly always improves overall performance. A Ethernet Switch can be easily configured in any Ethernet network environment to significantly boost bandwidth using conventional cabling and adapters.

Due to the learning function of the Ethernet switch, the source address and corresponding port number of each incoming and outgoing packet are stored in a routing table. This information is subsequently used to filter packets whose destination address is on the same segment as the source address. This confines network traffic to its respective domain, reducing the overall load on the network.

The Switch performs "Store-and-forward" therefore, no error packets occur. More reliably, it reduces the re-transmission rate. No packet loss will occur.

Auto-Negotiation

The STP ports on the Switch have built-in "Auto-Negotiation." This technology automatically sets the best possible bandwidth when a connection is established with another network device (usually at Power On or Reset). This is done by detect the modes and speeds at the second of both device is connected and capable of. Both 10Base-T and 100Base-TX devices can connect with the 100Base-TX port in either Half- or Full-Duplex mode.

If attached device is:	100Base-TX port will set to:
10Mbps, no auto-negotiation	10Mbps
10Mbps, with auto-negotiation	10/20Mbps (10Base-T/Full-Duplex)
100Mbps, no auto-negotiation	100Mbps
100Mbps, with auto-negotiation	100/200Mbps(100Base-TX/Full-Duplex)

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